STANDARD 3 – UPLANDS

Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.

Vegetation in the Lower Platte River Basin watershed in this assessment area is a mix of a variety of habitat and range types, interspersed within and between, and/or transitioning from one to another. An assortment of environmental factors influence the location(s), extent, seral stage(s), and/or types of vegetation found throughout the area. Elevation, precipitation zone, topography, soils and underlying parent materials, slopes, and exposures all contribute to the general vegetation composition throughout the watershed. In order to simplify the overall descriptions of vegetation types, this analysis will address vegetation types in relation to the elevation and topography in which they occur (and additionally closely tie to the associated precipitation zones), beginning at the highest portions of the watershed and descending to the bottom of the analysis area.

1) Characterization:

As mentioned in the background section, the most common vegetation type within the watershed is the sagebrush-grass type, which occurs to varying degrees (and with varying composition) throughout the elevation and precipitation ranges of the study area. Interspersed throughout the landscape are other assorted communities including sagebrush/mountain shrubs, saltbush steppe, greasewood lowlands, and aspen, cottonwood, spruce, ponderosa pine, lodgepole, spruce and limber pine woodlands, as well as badland type communities containing limited vegetation. Additionally, various combinations of communities and limited inclusions within specific community types are common.

From the highest elevations analyzed in this document from around 7,000 ft to a level of around 11,00 ft, the sagebrush-grass community is primarily dominated by mountain big sagebrush (photo 25-1). The mountain big sagebrush-grassland community occurs throughout the foothills and bases of mountain ranges and is intermixed with and surrounds many conifer and/or aspen woodlands. Shrub heights range from 6 to 30 inches, and canopy cover can reach up to 60%. After removal, mountain big sagebrush is relatively quick to re-colonize, reaching predisturbance levels in as little as 20 to 30 years (photo 25-2). Understory herbaceous species include buckwheat, larkspur, lupine, paintbrush, sandwort, mulesear wyethia, yarrows, Oregon grape, and penstemons. Grasses found in these communities include green and Columbia needlegrass, elk sedge, mountain brome, king-spike and Idaho fescue, Kentucky and big bluegrasses, and slender, thickspike, bluebunch, and western wheatgrasses. In many instances within the sagebrush community at these elevations, a large percentage of the overall shrub community is comprised of various other mountain shrubs including serviceberry, snowberry, antelope bitterbrush, mountain mahogany, chokecherry, and rose (photo 25-3). Lying in sandier sites at these higher elevations, the sagebrush-grassland community may be intermingled with bitterbrush shrub-steppe type communities, where antelope bitterbrush is either the dominant shrub species or is co-dominant with other mountain shrubs. Along some of the higher, windswept ridges, limber pine can be found clinging to the shallow soil.

At these relatively high elevations and precipitation ranges, and limited to somewhat sheltered areas where more moisture is gathered and retained throughout the year (mostly in steep draws facing north and/or east and along the slopes immediately adjacent to and climbing out of perennial and/or ephemeral riparian bottoms), small stands of so-called “dark timber” can be found. These stands are limited to the highest and wettest pockets of the evaluation area, occurring along the high slopes in the Sierra Madre front and the northern reach of the Medicine Bow mountains. Vegetation in these pockets is dominated by coniferous trees sometimes intermixed with aspens and various understory shrubs, grasses, and forbs which can withstand being shaded by the overstory. Overstory tree growth may include subalpine fir, lodgepole pine, spruce and aspen. Although limited by litter and shading,

understory species within these stands includes species such as shrubby cinquefoil, currants, Oregon grape, grouse whortleberry, arnica, hieraceum, and woods rose.

Limited to sites that are inherently wetter or retain moisture for longer periods (mostly north and east facing bowls and slopes which trap more winter snow and less evaporation), aspen woodlands are scattered throughout the high-to-mid-level elevations in the area (photo 26-1). Obviously dominated by aspens, understory species include snowberry, serviceberry, Scoulers willow, creeping juniper, rose, Oregon grape, geranium, bluebells, elkweed, columbine, licorice-root, sweet cicely, aster, elk sedge, Columbia needlegrass, blue wildrye, mountain brome, and slender wheatgrass. Forage is limited by litter/leaf cover and shading of the floors of the stands. Aspen stands are limited to the southern and eastern portion of the watershed, carpeting the foothills of the Sierra Madre and Medicine Bow Mountains, and continuing in scattered locales along Miller Hill and Atlantic Rim. Common at the higher elevations, and in many cases surrounding and/or intermingled with aspen stands, the mesic upland shrub steppe vegetation type is widespread. It is dominated by serviceberry and/or chokecherry and occurs on moderately-deep to deep soils. The dominant shrubs in this type can reach heights of ten to fifteen feet and occur in open to dense stands. Understory species include snowberry, rose, and currants, along with basin wildrye, green and Columbia needlegrass, Kentucky bluegrass, bluebells, columbine, aster, violets, elkweed, chickweed, and stinging nettle. Both aspen and mesic shrub types respond well and quickly to disturbances from fire.

As elevation is lost and the corresponding moisture regime drops, mountain big sagebrush begins to intermingle with and give way to Wyoming and basin big sagebrush stands and big sagebrush/grass/mountain shrub mixtures. Mountain shrub vegetation types encountered throughout this zone on shallow soils and/or shallow rocky sites include relatively monotypical and intermingled xeric upland shrub steppe sites. This vegetation type contains true mountain mahogany, in some cases as the dominant shrub species, but more often intermixed with other mountain shrubs including bitterbrush, snowberry, serviceberry, and basin big sagebrush. Dependent on soils, precipitation, and browsing levels, the dominant shrubs may reach up to five to seven feet in height. Common understory species are green needlegrass, needleandthread, bluebunch wheatgrass, Indian ricegrass, Sandberg's and mutton bluegrass, and mat forbs such as phlox, buckwheat, locoweed, and goldenweed. Wetter sites nestled within the rolling terrain are dominated by stands of basin wildrye.

As the transition to lower elevation progresses, Wyoming big sagebrush takes the place of mountain big sagebrush on the shallow to moderately-deep soil sites, and basin big sage dominates shallow draws and swales where deeper soils occur within the sagebrush-grass communities (photo 26-2). The xeric upland shrub steppe type is found at these elevations, where mountain shrubs tend to become dominated by mountain mahogany and bitterbrush that tolerate drier conditions. In wetter areas (draws, areas near seeps, north and east-facing slopes), instances of the previously-described mesic upland shrub steppe vegetation type can be found. Throughout the sagebrush-grassland communities at these elevations, rubber rabbitbrush, winterfat, and low rabbitbrush, as well as shadscale and gray horsebrush, are interspersed with the sagebrush (picture). Grasses in the understory include slender, bluebunch, and western wheatgrasses, needleandthread, prairie junegrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail (picture). Forbs that thrive in the understory include phlox, penstemons, Hookers sandwort, buckwheat, locoweed, and cryptantha. Additionally, greasewood begins to appear in the more saline areas.

At the lowest elevations in the (analyzed) watershed area, sagebrush-grass vegetation types continue to be typified by Wyoming and basin big sagebrush, interspersed with lowland shrubs including greasewood, horsebrush, spiny hopsage, and rabbitbrush (picture 48-5). As soils become more saline, salt-tolerant species tend to dominate, and the sagebrush-grass type is replaced and interspersed with the saltbush steppe-type community, dominated by Gardner's saltbush, bud sagewort, shadscale, winterfat, and birdsfoot sagebrush (photo 26-3). Birdsfoot sagebrush is also found on more alkaline soils with higher pHs. On flats with higher pHs, it is found in mostly pure stands and along slopes or ridges and/or as the pH drops, it becomes mixed with species such as Gardner's saltbush and other grasses and forbs. Understory species that are found in these communities include winterfat, western wheatgrass, Sandberg's bluegrass, Indian ricegrass, bottlebrush squirreltail, threadleaf sedge, phlox, hooker sandwort, buckwheat, and other mat forbs. Within the analyzed watershed area, these sites primarily occur within

the lower elevations of the Sage Creek Basin Greasewood flats are also common (although scarce relative to sagebrush-dominated communities in this area), occurring on lowland flats where, for one reason or another, the vegetation is influenced by high salinity and seasonal water (sometimes standing), where other, higher shrubs tend to be excluded (photo 27-1). In some cases, these sites are interspersed with Nuttall's saltbush. The understory herbaceous component contains phlox and asters, Indian ricegrass, Sandberg bluegrass, needleandthread, western wheatgrass and squirreltail. Another low sage type found at these elevations and precipitation zones is the alkali sagebrush type, which occurs in clay soil. It occurs in relatively pure stands and grows to between six and eighteen inches in height. Intermingled vegetation species found within these communities are very similar to those found in the other low precipitation, low sagebrush communities.

Finally, interspersed throughout the lower-elevation portions of the system, badland-type sites are spread haphazardly, consisting of relatively low-production vegetation types with very little soil accumulation and/or ground cover. Soils associated with these badlands are generally of heavy texture and contain salts that limits vegetation. In addition, the soils and underlying parent materials in badland sites are very soft and highly erosive, and the landscape is cut with a large number of drainage channels. Vegetation in these sites, although sparse, contains species ranging from Wyoming big sagebrush and antelope bitterbrush to scattered bunchgrasses (including Indian ricegrass and needleandthread). Although scattered throughout the analysis area, badlands primarily occur south of Bolten Rim.

Principal human uses throughout the area, which impact the vegetation resource, tend to center around allocations of forage for livestock (in some cases and/or areas, forage is not specifically allocated, and may by used by wildlife), removal of native vegetation during the course of mineral exploration and extraction, and recreation uses. Additionally, vegetation in the watershed is directly influenced by human activity through the application or repression of intentional and/or naturally occurring "vegetation treatments," including wildfire, prescribed fire, chemical, and mechanical vegetation removal.

Livestock use at higher elevations is comprised of cattle and limited bison grazing (Home Ranch allotment). Seasons of use at these elevations is restricted to late spring, summer, and early fall, during which time the area can be accessed and the vegetation utilized by grazing ungulates – snow usually precludes year-round use. Cattle operations vary between grazing of cow-calf pairs, yearling steers, and yearling and/or second-year heifers. Grazing use occurs during various portions of the spring/summer/fall seasons, ranging from season-long to deferred and/or rotational use. At the mid-to-lower portions of the watershed, summer cattle use is made either seasonally or through rotation of livestock through use areas. Summer cattle use in various configurations is made throughout the majority of the watershed at mid-to-low elevation levels. In some scattered allotments, cow-calf pairs make winter use of the forage.

Recreation primarily takes place during the late-summer and fall months as hunting (mid-August through November), although spring/summer/fall use occurs along the Platte River, and springtime recreational uses such as shed-antler hunting continue to increase at an accelerated pace. Associated with this use are an ever-increasing number of roads, trails, and tracks, which wind through all of the vegetation types and are restricted only by topographical impediments.

Vegetation in a small portion or the north-eastern watershed area has also been impacted by coal mining and its associated reclamation. Associated with this mineral extraction are networks of additional roads and water sources.

Additional human uses of the watershed include commercial seed collection, off-highway vehicle use not associated with the previously-mentioned activities, and the collection of moss-rock for commercial decorative purposes. All of these activities influence the vegetative component of the watershed where they occur, either indirectly via associated changes, or directly by contact with and/or removal of vegetation.

2) Issues and Key Questions:

Removal of vegetation in the form of grazing forage for large ungulates has been and continues to be the principal factor affecting vegetation throughout the Lower Platte River watershed. Domestic livestock grazing tends to provide the most impacts to the vegetation of the watershed, throughout its area, although localized portions of the watershed (or specific vegetation communities and/or species) may by more influenced by grazing of wildlife.

Through varied management processes, including rangeland inventories, management agreements and grazing plans, and implementation of various "best management practices," stocking rates have been adjusted to fit available livestock forage on public lands throughout the watershed since inception of the Taylor Grazing Act. Because of these adjustments, livestock management issues relate to the season, duration, and distribution of use rather than stocking rates (although limited exceptions exist.) These issues are primarily directed at impacts to sagebrush/grassland and sagebrush-mountain shrub/grassland vegetation types in the form of the following impacts:

- Uneven use patterns (heavier grazing use associated with reliable water sources as opposed to light to nonexistent forage utilization in other, more isolated locations).

- Shifts in vegetation species types that favor increaser forage species (e.g., western wheatgrass) and aggressive warm-season annuals over cool-season, perennial vegetation types (such as bunchgrasses) where uninterrupted, season-long livestock grazing occurs (picture).

- Variations in herbaceous vegetation availability where season long and/or growing season livestock use has pushed more desirable forage species from open, "easily accessible" locations (spaces between shrubs) to more protected, "sheltered" spots (e.g., under and within sagebrush and other shrubs.) This allows less desirable species such as rhizomotous, single-stalked grasses (e.g., western wheatgrass) to colonize and spread, thus lowering overall ground cover and forage value.

The key question that arises from these impacts focuses on implementation and refinement of best management practices for livestock grazing. What opportunities exist to implement or refine best management practices for livestock grazing or other actions that will maintain and/or improve the overall condition and value of upland vegetation and meet desired resource conditions and allow for grazing of the vegetation resource use by domestic livestock as called for under the Bureau's multiple use mandate?

Policies that govern the use of vegetation treatments and the suppression of such vegetative community alteration, have played and continue to play an important role in the existing make-up and continual alteration of vegetation in the watershed. Aggressive wildfire suppression, and an inability to successfully implement manipulation of shrubland communities within the watershed at the level which is required, has led to a predominance of uniform, older age-class shrub stands throughout the analysis area. A large percentage of sagebrush, mixed sagebrush/mountain shrub stands, and in some cases coniferous forests have reached a level of overly mature to decadent, leading to lower herbaceous ground cover, species diversity, plant vigor, forage, and nutritional value (for livestock and many big game wildlife species.) Additionally, large, uninterrupted expanses of vegetation allow for large-scale losses of key habitat types if and when natural disturbances occur. The key question is how do the BLM and other natural resource management agencies and partners determine the level of vegetation treatment which should occur in order to promote better overall landscape diversity for all species? To what extent should portions of key vegetation types and habitats be temporarily altered in order for the overall condition of the vegetation/habitat/watershed be maintained or improved?

The next most important factor relating to upland vegetation condition throughout the watershed is use of varied vegetation resources by native wildlife, in particular, ungulate big game species. The principal issues that should be addressed regarding big game management relate to seasonal habitat forage requirements for mule deer, elk, and pronghorn antelope. Although transitional, winter/yearlong, and crucial winter ranges for all species have

traditionally been the habitats of concern (limiting the populations), relatively recent research has elevated the importance of quality spring/summer/fall habitat to healthy individual and population conditions. Key questions to be addressed include how to manage vegetation resources on key seasonal habitats to provide adequate quality forage for wildlife species, yet continue to provide forage for seasonal, managed livestock use. How can the mix of uses of the vegetation resource in the watershed be managed so that vegetative condition is maintained or enhanced? Additionally, how do the principal players (agencies and landowners) involved in the management of vegetation and wildlife within the watershed balance the sometimes necessary impacts of multiple use management (and/or livestock management) activities with habitat requirements on seasonal big game ranges?

Finally, an increase in the expansion of unimproved roads and trails where access is available, with the associated increase in the amount of off-highway vehicle (OHV) use, is apparent throughout the watershed. This use is most associated with general recreational activities by the public and is not usually associated with development actions described previously (although those actions may alter the landscape in ways that encourage further OHV expansion.) The popularity and affordability of small, all-terrain vehicles leads to their use farther and farther into previously remote and unroaded areas, creating or "pioneering" unauthorized and illegal trails through the vegetation wherever possible, which are then repeatedly traveled until vegetation is lost along the route, and it becomes a road for all practical purposes. As the only barriers to this travel are terrain and rules governing off-highway travel (which are difficult to enforce), only vegetation in the roughest topography is currently or potentially free from this disturbance. This disturbance leads to vegetation shifts and losses similar to those associated with the expansion of oil and gas exploration and extraction, but extend into much longer-term time frames as there is no reclamation of the disturbance unless a pioneered road or trail is left to naturally revegetate through a lack of use (which, with ever-increasing recreational use of these lands, rarely, if ever, happens). Additionally, recreational OHVs are not subject to minerals management stipulations designed to mitigate the spread of weed seeds, and so have the potential to add weed infestation to their impacts. The key questions which should be addressed center around the need for the Bureau to decide if limits should be set which regulate off-highway vehicle use, what they should be, and how to effectively enforce these limits. Additionally, what educational tools should be employed to reduce impacts from recreational uses of public lands?

3) Current Conditions:

The entire watershed area is allotted to some form of livestock grazing use during various periods of the year and is also utilized for wildlife grazing use in its entirety (although in most cases, significant wildlife use is seasonal.) Impacts to vegetation from grazing can, therefore, be expected to occur to measurable extents throughout the analysis area.

Quantifiable data about current vegetation conditions, vigor, and trends throughout the watershed varies as to availability, content, and quality. Upland monitoring information is available for varied grazing allotments and sub-basins within the watershed in the form of photo-points, aerial and basal cover transects, utilization studies, shrub belt density transects, and other, more species and/or impact-specific studies. Studies vary by amount, type, and content throughout the watershed in relation to the relative priority of the area/allotment, the level of management that was or is implemented, and/or the urgency of determining specific impacts. In the past, monitoring efforts focused on the collection of utilization information (what animals do to the plant), rather than on trend information (what the plant response is to animal use).

Vegetation and forage inventories of the watershed area have occurred periodically during the relatively recent past, the last of which, the Soil Vegetation Inventory Method (SVIM) occurred during the early 1980s. Data from this one-time inventory suggested that rangeland conditions throughout the watershed fell into the acceptable range, mostly rated as "good" condition, but including "excellent" and "fair" condition rangelands. To a far lesser degree, isolated incidences of varied vegetation types were categorized as "poor" condition or unsuitable for livestock grazing (such as badlands and/or igneous outcrop types.) It should be noted, however, that these inventories and associated conditional assessments were one-time snapshots of the vegetation communities and did not and/or have

not been altered or updated to take into account trends in ecological vegetation conditions. They also tended to undervalue shrub communities, resulting in mule deer habitat rated as fair, which should have been found to be good to excellent.

In general, varied livestock uses have resulted in assorted impacts to vegetation throughout the watershed. In many grazing allotments, summer grazing by cattle is the best-suited use by domestic livestock due to environmental, topographical, and climatic limitations, and vegetation is impacted (to various extents) during its growing period. This type of use also tends to primarily impact the herbaceous component of the vegetation community, except where young, available, palatable shrub seedlings are abundant. Wildlife use in the watershed, usually seasonal, tends to impact different components of the vegetation communities than does domestic livestock use. Mule deer use concentrates primarily on shrub or "browse" species and is most pronounced on winter ranges where the animals concentrate for extended periods. Elk use impacts both the herbaceous and browse components of the communities, usually at higher elevations throughout the year (dependent on the severity of winter weather). Pronghorn use impacts tend to be most noticeable in the lower elevation sagebrush and saltbush steppe, where they may be extremely concentrated during the winter, but more nomadic than other species (somewhat mitigating their impacts.) These differences in impacts tend to affect vegetation communities as species are favored or shunned in various management/use scenarios, leading to shifts in overall community make-up. Vegetative traits such as species abundance, vigor, diversity, and age/structure classes are all affected. These trends occur in addition to those which are influenced as a function of natural conditions (e.g., wetter to dryer sites, slope, aspect, soil depth, and material).

In many cases (dependent on the specific situation), best management practices for livestock grazing have been implemented on a case-by-case basis throughout the majority of the watershed. In some cases, multiple practices and improvements were necessary to maintain or improve overall vegetative condition, and in others, only minor adjustments to grazing management have been or are required. Direct changes to grazing timeframes, including adjustments to duration, intensity, and season of use, have been implemented to remove constant, repetitive pressure on key forage communities during the heart of their growth period. Rotational grazing schedules that include deferment and recovery periods allow for preferred vegetation species to concentrate energy reserves towards vegetative growth. Upland water developments, including small stockponds and reservoirs, water wells, spring developments, and pipeline systems have led to better overall distribution of livestock use and facilitate grazing rotations and pasture systems. Fencing has been implemented to control livestock movement, allowing rotational grazing systems, and better distributing livestock use. Finally, vegetation treatments have been applied to limited areas within the watershed in order to introduce, or in some cases accelerate, the rate at which vegetation communities evolve and develop towards different seral stages. Very seldom (if ever) are vegetation treatment projects initiated with the objective of *converting* vegetation permanently to another type, but instead are intended to set the existing community back to an earlier seral stage and stratify the overall age class and structural variation to promote landscape diversity similar to what probably existed prior to European settlement when natural fires occurred (photo 30-1). Treatment of (mostly) shrub stands can also be used to improve livestock distribution, diversify shrub age classes and structure, and increase forage quality and herbaceous content (through the removal of competition for nutrients and moisture). Overall, livestock management throughout the watershed has been improved through the use of rangeland improvements and more intensive management without resorting to grazing exclusion, complete rest, or reducing permitted use.

At the higher elevations within the watershed, livestock grazing occurs primarily as managed, summer/fall cattle use. Wildlife grazing occurs primarily as spring/summer/fall use, although much of the area is considered important as transitional range for migrating big game. During milder years, the higher elevation may be used by wildlife well into or through the winters, primarily by herds of elk. In the majority of the grazing allotments within these areas, BMPs are in place to one extent or another, which mitigate negative grazing impacts and accentuate the positives. In many cases, grazing is rotated between pastures or use areas in order to lower the pressure placed upon desirable herbaceous forage species. Where these grazing management practices are employed, bunch grasses are abundant between shrubs, and herbaceous forage quality, including diversity, vigor, and density, is

considered to be good to excellent. Examples of this can be found in the Bolten/Pine Grove, Coad and Elk Mountain allotments, which have all experienced some form of rotational grazing, upland water development, pasture fencing, and/or vegetation treatments. Utilization of upland forage vegetation tends to only become heavy or severe immediately around or adjacent to water developments or natural water sites. Pastures or allotments in which season-long livestock use takes place during the summer exhibit symptoms of degraded upland vegetation conditions to varying extents. One example is the Sixteenmile allotment, which has received season-long cattle use on a continuing basis and where desirable upland bunchgrasses, although still present, are found mostly where they are not available to grazing animals, such as within or under shrubs. Most of the higher elevations in the allotment do not exhibit high amounts of invader species, but contain high percentages of less desirable and/or palatable increaser grasses and forbs such as western wheatgrass and Kentucky bluegrass. Browse species at higher elevations tend to be utilized through their growth period by (mostly) big game wildlife species, primarily mule deer and elk, but the use is dispersed to the point that specific instances of over-utilization (characterized by shrubs with a hedged appearance, and upon closer examination, vegetation removed far past the woody portion of previous year's growth) are rare on upland species.

Where small portions of sub-basins at the higher elevations have been treated, monitoring has shown that (with managed post-treatment use) the overall health of herbaceous vegetation is higher, with higher plant densities and increased species and cover diversity. Because most treatments are conducted to obtain a mosaic pattern, shrub age classes are diversified between older, mature-to-decadent shrub stands interspersed within and around areas set back to an early seral stage, which include many juvenile to young plantsamples of these mixed vegetation communities, achieved through the recent application of treatments, include portions of the Bolten/Pine Grove allotment, which were treated during the last five years. Through the majority of these sub-basins, intentional treatments or natural events have been precluded or suppressed prior to gaining significant acreage, and the sagebrush and mixed sagebrush/mountain shrub stands contain plants of a uniform age and structural class, in almost all cases ranging from older-mature to decadent with a large proportion of dead individual plants. Although aerial canopy cover from shrubs can be quite high, the nutritional value and production drops, and overall ground cover percentages remain low and continue to decline over time as the understory is shaded by the larger shrubs and out-competed for nutrients and water. These areas exhibit lower species diversity and lower herbaceous cover, production, and nutritional value for livestock and wildlife forage.

The lack of treatments and aggressive suppression of all natural fire within these sub-basins has also affected the condition of aspen and conifer stands by allowing them to over-mature and/or become decadent, diseased, and increased encroachment of understory shrubs and coniferous vegetation (fir and pine at the highest elevations) within the stands. Bleeding rust is present in many aspen stands, primarily affecting larger trees, but spreads through the root systems to younger trees in the same clone. Removing these larger, diseased trees can prevent the bleeding rust from spreading to young trees. As the older trees die or fall to wind events, they are not replaced by juveniles or suckers, and eventually, the stand dies or is reduced to a few remnants, dominated by big sagebrush, serviceberry, or other mountain shrubs. Of course, historical season-long livestock grazing has concentrated use on the seedlings in the past, but relatively recent implementation of rotational use and other upland grazing management tools currently mitigates these impacts, leaving a lack of stand replacement events as the missing element to enhanced aspen health. Prescribed burns are being planned and implemented to restore aspen health by stimulating sucker regeneration and removing other plant species that compete with aspen.

As elevation drops in the watershed, areas continue to be utilized for spring/summer/fall cattle grazing. Wildlife use consists of yearlong habitat utilized by resident populations (predominantly mule deer and pronghorn antelope) and areas of winter range (along the Platte River and the Saratoga highway).

As at higher elevations, impacts to vegetation vary dependent on implementation of BMPs and to what degree management practices have been implemented. Where long-duration, summer season grazing occurs as the primary livestock impact, desirable bunchgrasses have retreated to areas where they are unavailable to grazers and have been largely replaced in open areas between shrubs by increaser species such as western wheatgrass, annual

forbs, and prickly-pear cactus. Conversely, positive shifts in vegetation conditions can be seen in even a relatively short timeframe when BMPs are emplaced, as evidenced by recent management changes implemented in the Bolten/Pine Grove allotment. In this area, the saltbush steppe flats are steadily showing an increase in bunchgrass species and becoming more densely revegetated by a preponderance of squirreltail and Gardner's saltbush where bare ground previously dominated (photo 32-1, 32-2). These changes have been monitored after initiating a rotation of spring grazing use between two pastures where previously, only season-long grazing occurred throughout the allotment.

As vegetation at these elevations is usually available and relatively snow-free in all but the most severe winters, it may be used by wintering and/or migrating wildlife as transitional or crucial winter range. Because vegetation communities in these specific areas are used throughout the year by wildlife, and become heavily-used by concentrated populations during most, if not all, winter months, the preferred browse species are comprised of even-aged and structured, mature-to-decadent shrub stands. Although high levels of grazing use from pronghorn can harm shrubs such as saltbush and sagebrush during the winter if animals are concentrated in a limited area for a long time period, it does not appear at this point that extreme impacts are occurring to vegetation from wintering antelope.

Similar to higher elevation shrub stands, vegetation within the mule deer and elk winter habitat zone has been largely untreated and natural treatment events have been aggressively suppressed before large acreages can be burned. As with higher elevation vegetation, this has allowed monotypic shrub stands to be dominated by mature-to-decadent, even-age classes of shrubs. Vegetation generally exhibits high vigor, plant density, and diversity where BMPs have been initiated. Some of the heavier stands of basin big sagebrush located within draws and swales, however, exhibit high levels of density in the shrubs themselves and suppressed understory herbaceous vegetation condition.

Within the lowest and westernmost elevations of the watershed, impacts to vegetation occur mainly in the form of livestock use, consisting of summer (and in limited cases winter) cattle use. The summer cattle grazing is managed, for the most part, in a manner that allows either rotational growing season deferment, rest, or recovery periods or a combination thereof. This has led to increased occurrence and availability of more palatable and desirable bunchgrass species and a general increase in overall vegetative condition. Limited winter cattle grazing occurs during the dormant season, when energy is stored beneath ground, and so poses few negative impacts to the plant(s) as long as pressure is not reintroduced during early spring green-up or maintained on limited locations for long periods of time, removing most to all of the above ground biomass. Where management such as rotational summer use, fencing, and upland water development has been introduced and/or historically implemented, healthy, vigorous, and diverse understory grasses and forbs are present, and bare ground is minimized between plants. Although increaser species are present throughout the area, most are proportional to more desirable bunchgrass, forb, and shrub species.

Vegetation in this area is used seasonally to varying degrees. Summer use by pronghorn antelope occurs throughout the area, while winter pronghorn use usually occurs along the Saratoga highway and in the saline uplands of the Bolten/Pine Grove allotment causing little impact to vegetation within the subject area. Mule deer use during the spring, summer, and fall occurs primarily in the mixed sagebrush/mountain shrub-grasslands at higher elevations, and winter use along the Platte River. Vegetation used by elk is primarily concentrated to a combination of grasses, dried forbs, and limited browse species utilized during the winter months. Although use occurs during the summer months, the limited number of animals and their highly wandering nature make it relatively immaterial in comparison to summer cattle (both of which exhibit high dietary overlap with elk). As with mule deer, elk populations and use levels rise dramatically during the winter months when migratory animals move in. Summer utilization levels (by cattle, and/or summer elk populations) of forage species used by elk has not appeared to adversely affect winter range forage amounts, apparently leaving enough standing forage to sustain wintering herds.

Overall, vegetation in the Lower Platte River watershed can be considered to be in good condition relative to the seral stage to which it has developed. Desirable species (including herbaceous and browse species important for livestock and wildlife forage, as well as those important for ground cover) are present at worst, usually found in locations where they are less available or vulnerable to grazing animals, and are prevalent at best, found interspersed throughout the various plant communities, with high vigor and density. Although less desirable increaser species are present in varying degrees throughout the watershed, in most cases, their presence does not indicate poor health or nonfunctional vegetation communities. The majority of the watershed has undergone the implementation of various BMPs, to some extent, which favor more desirable forage species over increasers, and the results can be readily observed in the form of more plentiful bunchgrasses, higher ground cover, greater plant diversity, and higher vigor and nutritional value of individual plants. Throughout various portions of the watershed, upland invader and weed species can be found, but these populations exist at relatively low levels and have not converted entire communities. Additionally, implementation of various BMPs, as well as application of various control methods, are being and can be utilized to manage, if not eliminate, many of these small-scale infestations. All of these observations are indications of properly functioning upland vegetation communities.

4) Reference Conditions:

Generally, historical influences on vegetation in the watershed were similar to those that shape the communities today. Environmental conditions, including soil conditions, climate, topography, and elevation determined the general composition, location, and interaction of vegetation communities, which were and are influenced by additional, less constant factors. Due to low human population levels in this remote area, influences by native peoples were probably relatively minor and/or secondary in nature (e.g., the influence that hunting cultures had on seasonal use of certain areas by grazing game animals). Prior to settlement of the area by Euro-Americans, additional factors that probably had the most influence on vegetation conditions would have been limited to grazing impacts from native ungulates and catastrophic stand-replacement type natural events such as wildfires. The combination of varied, wandering use patterns and the random occurrence of wildfire, which removed vegetation in a haphazard pattern, probably led to a diversified vegetation pattern that was thoroughly stratified in age class and seral stage, as well as vertical and horizontal structure. It is such diversity at the landscape scale and maintenance of age class stratification and structure diversity that past and future vegetation treatments are intended to simulate.

The early descriptions of portions of the watershed suggest the presence of grazing ungulates throughout, including seasonally migratory species such as bison, pronghorn, mule deer (called black-tailed deer in many early journals), and elk. Additionally, bighorn sheep and grizzly bears could be found, even at lower elevations. Although wildlife population levels prior to the adoption of structured harvest strategies and conservation measures in the first half of the 1900s can only be estimated, most of the species remain (excepting wild bison, bighorn sheep, and the large predators including wolves and grizzly bears). Topographic and climatic factors would have dictated seasonal use areas and migration patterns then, much as they do today. Although, as indicated by various accounts, herds of bison could be found through the watershed on a resident basis, the area was also used by extremely large herds of the animals in more of a cyclic nature as their wanderings covered an extremely vast amount of country. This use is evidences within the watershed by the prevalence of journals entries, and the presence of buffalo jumps.

Historical documentation, mostly in the form of journals, descriptions, and writings of explorers who traversed the area in the mid-1800s, compared and contrasted with additional accounts made in the same area during the same general time frame, can paint a picture of the overall landscape. Although generally vague to the point that overall vegetation, range, and/or habitat communities and sites cannot be delineated, they do provide a fairly recognizable overview of the area.

Overall, the general historical vegetation description of the Lower Platte watershed appears to closely correspond to the existing communities. Although the popular perception of western rangelands prior to Euro-American settlement is that of rolling grasslands and foothills bounded by timbered mountains, which have only relatively recently (in the last century and a half) been turned to shrub-dominated steppe type communities due to grass use

by livestock, accounts offer a different view, indicating shrub dominance in this area through the mid-and-late-1800s. John C. Fremont's party viewed the general area as early as 1845 and indicated that in the area west of Overland Crossing of the Platte River there was "nothing to be seen but artemisia bushes." F.V. Hayden traveled through the area in September, 1868, performing geological exploration and wrote; "This vast barren sage plain stretches far westward [from Pass Creek] to Bitter Creek and Green River, with very little grass or water for the traveler . . . ."

If taken as a whole and compared to and against each other, these specific accounts and those presented in Standard 1 and 2, tend to suggest that the majority of the upland vegetation in the Lower Platte River watershed varied little from that which is noted today, dominated by heavy sagebrush and mountain shrubs with inclusions of aspen woodlands at higher elevations, rolling sagebrush-grasslands and arid saltbush steppe communities, relatively low in production.

Historical or reference vegetation conditions in the Lower Platte River watershed prior to extended human influence appear to mimic those found today; i.e. species composition and general distribution are probably very similar. Although, in the higher elevations, fire suppression may have affected the seral stage of communities and age class structure and the virtual eradication of large-scale, random, stand-replacement type vegetation treatments throughout the majority of the watershed and the manipulation and management of those that do occur.

5) Synthesis and Interpretation:

As described and discussed previously, upland vegetative species within the Lower Platte River watershed are very similar at present to that which would have been encountered prior to settlement of the area. The principal changes are in the type of animals, which utilize the resource, and the amount of disturbance that is levied towards the vegetation from other human activities. Sagebrush and mixed sagebrush-mountain shrub grasslands and aspen and conifer woodlands continue to dominate the landscape throughout the watershed. The most obvious changes in vegetation on the landscape are evident where all or a portion of an existing community has been removed or "converted" to some other type. This can be observed along roads and trails in the landscape, which cut through and dissect large-scale community types; or agricultural conversion such as irrigated or dry-land farming where the native vegetation has been removed to make way for croplands (most commonly alfalfa or native grass hay land in various portions of the watershed)(photo 34-1). Less obvious are changes within vegetation communities that have occurred naturally as communities evolve or have gradually been altered through the addition, subtraction, or manipulation of additional influences (e.g., a shift in vegetation consumed as traditional livestock uses are supplanted by animals with different dietary preferences).

Shifts in vegetation communities from historical conditions are partially the result of use by grazing ungulates. Generally, grazing use throughout the watershed has placed pressure on developing vegetation through various portions of its seasonal life cycle. Late spring and early summer grazing by cattle, historic sheep, and/or big game wildlife species places the majority of grazing pressure on growing herbaceous material (photo 34-2). As the summer hot season progresses, cattle use within the watershed continues to primarily remove grasses, while sheep (which are mostly absent from BLM-managed public lands in the watershed at this time) and wildlife use tends to shift towards browse species on uplands. Fall and winter use by cattle, and wintering elk herds, although still focused on grasses, removes mostly dead and dormant material, and pronghorn, and winter mule deer use removes portions of the summer's growth mostly on shrub species mixed with dried and desiccated forbs. Shifts in composition that have occurred internally in various upland vegetation communities in the watershed (due to grazing pressure by ungulates) have been primarily driven by the following factors: continuous, repeated, and sustained grazing pressure on selected, preferred herbaceous species through their peak growth periods (primarily on cool-season bunchgrasses during late spring and early-to-mid-summer), and intense, concentrated, and sustained seasonal browse use on preferred shrub species (by wintering big game herds) in stands that have reached a high overall level of late-maturity to decadence.

Historically, the higher elevations within the watershed were grazed by a combination of summer cattle and transitional (spring and fall) and summer sheep use (picture). Lower elevations were traditionally used as winter sheep grounds, with limited amounts of summer cattle grazing, usually in higher fringe areas. The summer, season-long grazing that occurred repeatedly during the last century has generally allowed more of an influence by increaser species within communities and tended to push more desirable decreasers to more unavailable locations (such as within shrubs and in rougher terrain). Availability and predominance by more desirable forage species is enhanced as distance is gained from water sources, and terrain becomes steeper. Winter use areas at lower elevations, where herded bands of sheep have been moved throughout the terrain in a nomadic fashion, tend to retain most of the desirable increaser forage species in a more available fashion, due to the timing and duration of use (dormant season and relatively-short periods of use which are not repeated during any one year.) Livestock grazing management changes have and can be implemented in order to mitigate the effects of growing season grazing pressure and include pasture or use area rotational systems that manipulate the duration, intensity, and timing of use to provide deferment and/or recovery periods for vegetation growth. Fencing and/or herding are used to control the livestock's activities during use periods, facilitating implementation of rotational systems, and upland water developments are designed to more evenly distribute levels of vegetation use throughout pastures and allotments, protect isolated riparian sites, and provide watering locations to dry pastures. Additionally, the predominant vegetation (typically shrubs) can be treated or removed, allowing increases in more productive herbaceous vegetation which creates higher amounts of forage, higher overall nutritional value, and can create useable forage in areas which were previously underutilized. These types of treatments are usually temporary in nature, and revert to pre-treatment conditions after the passage of various time frames, allowing other areas to be manipulated during the interim and creating a mosaic of vegetation types. During the last half of the 20th century, all of these practices have been implemented, to various extents; throughout the watershed where summer cattle grazing use occurs. Due to political and/or logistical limitations, vegetation treatments have been restricted in the watershed more than implementation of other BMPs. During the last 25 years, as many of the traditional winter sheep use areas have undergone conversions to summer cattle use allotments, additional BMPs have been implemented at lower elevations, where customarily, none were required.

Wildlife impacts to vegetation, although applied across the watershed, tend to most directly impact preferred, desirable shrub species on transitional, winter-yearlong, and to a lesser extent truly "crucial" winter habitat for mule deer. Most intensive negative impacts can be observed on the mid-elevation transitional and wintering habitat, where large herds have settled in for the last several "easy" winters and removed large portions of the current and previous years' vegetative growth. As the individual plants reach a stage of over-maturity and decadence, annual vegetative production decreases, and as the current and/or portions of the previous years' growth is removed, the plants become more and more hedged, further deteriorating overall stands. New, juvenile plants are removed quickly if they are available, due to the higher palatability and/or nutritional content, leading to an overall loss of productivity and further aging of the stand. Additionally, as stands age, rival vegetation surrounding the shrubs, such as junipers, tends to spread into and intermingle with the shrubs, out-competing them and shifting the overall community composition. Management changes that would focus on stratifying shrub stands and diversifying overall community composition, stand age and structural class, and habitat production would center on setting portions of the communities back to early seral stages, in staggered time frames. This would involve the application of treatments to remove portions of the existing vegetation in a mosaic pattern, allowing recolonization of new, juvenile shrub species, new and additional herbaceous species, and shifting the community composition immediately following conversion. Treatments can be designed in scope, coverage, seasonality, and implementation methods to achieve predetermined objectives and to allow medium to long-term community development towards habitat objectives. Treatments can also be planned and implemented so that total vegetation community conversion is not achieved or encouraged, allowing shrub stands to evolve towards pre-treatment conditions over an extended timeframe. In many areas considered "crucial" winter range in the watershed, shrub stands appear to be in better overall condition, most likely due to more limited seasonal use, affecting less of the current year's growth, and very rarely extending into the previous year's production. Recent cooperative efforts ona large scale have been undertaken to diversify these important shrublands.

Loss of vegetation that occurs due to the proliferation of roads and trails, although proportionally smaller than other impacts, tends to be more evident and can be equally severe on a small scale because all vegetation is totally removed along the entire area of impact. Even improved roads, if not adequately designed and/or drained, lead to vegetation loss/community conversion on adjoining lands through increased erosion/sedimentation immediately along the route and introduction of less desirable species from disturbance along the route. As noted in the watershed section, there is a large need for further work on nearly all improved roads to reach an adequate level of improvement practices (gravelling, additional culverts, wing-ditching, water-bars) to minimize or eliminate overland flow alterations and vegetation species movement/colonization. Equipment used to sustain or improve highly traveled routes should be maintained in a weed-free status, as noxious weed infestations have arisen in areas of recent maintenance in various portions of the watershed. Recreational use of roads and trails, and particularly the pioneering of new trails by illegal off-highway driving is increasing dramatically, including problems stemming from hunting, joy-riding and (especially noted during the last few years) the increasing popularity of antler hunting in the late winter and spring. Greater availability of disposable wealth has led to greater availability of all terrain vehicles (particularly 4-wheelers) and pickup trucks, which have exacerbated this impact, particularly in areas with easy access and proximity to towns, but also at an alarming pace in remote portions of the watershed.

6) Recommendations:

At the present, the review of upland vegetation conditions in the Lower North Platte River watershed reveals generally good overall community health. Natural ecological and biological processes appear to be functioning adequately overall, although concerns about current, and especially near-future, functionality of certain community types remain. Specifically, the review group has determined that the majority of upland vegetation communities are properly functioning in relation to the seral stage to which they have evolved.

The diversity, vigor, productivity, and overall amount of upland vegetation within the watershed, as well as the cooperation exhibited by the majority of livestock permittees towards grazing management, suggest that no insurmountable vegetation problems are evident on a significant scale in most vegetation communities. Due to the existing conditions and general vegetation community heath on uplands, the management responsibility by private industry, agricultural interests, and agencies which design and mitigate impacts to the vegetative resources from natural resource uses, and the generally small number of management issues that need to be dealt with, it is determined that the Lower Platte River watershed is meeting Standard #3 – Uplands. The following recommendations would expand upon the successes already achieved and help to meet desired resource conditions in the future.

Continue to implement or manage using best management practices (BMPs) for livestock grazing. These practices utilize, but are not limited to, the control of season, duration, intensity, and distribution of livestock use to meet desired resource objectives for upland vegetation as well as riparian habitat. Specific dates or timing of use must be decided on a case-by-case basis specific to the management unit and/or site limitations. Methods that can be used to achieve resource conditions include, but are not limited to, livestock control by pasture fencing or herding, water developments, vegetation treatments, and/or the manipulation of livestock turn-out/removal dates.

Identify and correct problems with improved roads which affect vegetation community health and/or composition, including the implementation of mitigation and/or improvements to improved travel routes that will modify overland flow regimes and erosion/deposition patterns which influence the surrounding and adjacent vegetation communities.

Vegetation treatments designed to modify the age and structural composition of predominant shrub stands and stratify the seral stage mix within stands should be continued and/or initiated and implemented throughout the watershed. Where treatments are utilized to improve the health and productivity of sagebrush and sagebrush/mountain shrub communities, they should attempt to promote juvenile, palatable shrub seedlings within the community in addition to increasing the herbaceous component. Mechanical treatments are necessary to thin

areas in the Medicine Bow mountains that have been neglected. Treatment methods designed to improve watershed conditions should (at least initially) maximize herbaceous vegetation and litter in order to provide healthy, productive forage and habitat for livestock and wildlife. On a long-term basis, treatments and pre/post-treatment management should be designed to promote healthy, diverse, natural rangeland conditions rather than the creation of homogeneous monotype communities covering large tracts of land.